

PRINCIPAL SUBJECT AREA

STATISTICS

100 LEVEL COURSES

ST 101 Introduction to Statistics (3 Credits)

Basic ideas in Statistics : Representation of data, Histogram, Frequency polygon, Ogive.

Measures of Location : Various Means (AM, GM, HM, TM), Median, Mode, Quantiles, Deciles, Percentiles. Measures of Dispersion : Range, Interquartile range, Variance, Standard deviation, Chebyshev's rule for sample, Sheppard's correction for variance, Coefficient of variance, Moments of higher order, Skewness, Kurtosis.

Representation of data using Stem-Leaf diagrams and Box plots.

Regression and Correlation: Scatter diagrams, Linear Regression, Method of least squares, Correlation, Coefficient of correlation, Rank correlation, Spearman's rank correlation coefficient.

Index numbers: Introduction, Price Relatives, Quantity Relatives and Value Relatives. Link and Chain Relatives, Cost of living Index Numbers, Methods of construction of Index Numbers, Quantity Index Numbers, Tests for Index numbers.

Recommended Texts:

1. *Statistical methods*, J. Medhi.
2. *A Basic Course in Statistics*, G.M. Clarke, and D. Cooke

ST 102 Introduction to Probability Theory (3 credits)

Counting Techniques: Combinations, Permutations, Set partitions,

Elements of Probability: Experiments, Events, Sample space, Laws of Probability, Bayes' Theorem, Independence of events. Random variables: Discrete and continuous r.v.'s, Probability mass function, Probability density function, Cumulative distribution function, Functions of a random variable, Expectation, Moments, Mean and variance, Moment Generating function.

Probability inequalities: Chebyshev's and Markov's etc.

Distributions: Discrete: Uniform, Bernoulli & Binomial, Poisson, Geometric, Negative Binomial, Hypergeometric, Multinomial, Continuous: Uniform, Normal, Gamma, Exponential, Properties and applications of distributions, Probability Generating functions.

Approximation to Binomial using Poisson, Binomial using Normal, and Poisson using Normal.

Recommended Texts:

1. *Applied Probability and Statistical Methods*, G.C. Canovos .
2. *A Basic Course in Statistics*, G.M. Clarke and D. Cooke
3. *A Course in Probability & Statistics*, C.J. Stone

ST 103 Statistics Applications I (1 Credit)

(Prerequisite : ST 101 or any other Basic Statistics course)

Introduction to MINITAB, Data management: Editing, summarizing, Transforming and Manipulating Data, Graphical methods for describing data, Numerical methods for describing data, Distributions and Random data. Applications of statistical packages

Recommended Text:

1. MINITAB Reference manual
2. *Introductory statistics with R*, Dalgaard P.
3. *Data manipulation with R*, Spector P.

ST 104 Statistics Applications II (1 Credit)

(Prerequisite: ST 101 or any other Basic Statistics course)

Introduction to the SAS Display manager system, Structure of a SAS program, Editing, rearranging, displaying and summarizing data using PROC PRINT, PROC SORT, PROC FREQ, PROC MEANS, PROC UNIVARIATE, PROC FORMAT, PROC CORR PROC TABULATE, PROC STANDARD, PROC RANK etc. Creating Graphics using PROC PLOT, PROC CHART etc.

SAS Expressions, SAS Functions, Some SAS statements (ARRAY, DELETE, DO, DROP, FORMAT, GO TO, IF, INFILE, INFORMAT, INPUT, KEEP, LABEL MERGE, OUTPUT, PUT, SET, ID, VAR, TITLE, LIBNAME ETC.) Applications.

Recommended Texts:

1. *SAS Reference manual*

MT 105 Real Analysis I (3 credits)

Real number system as a complete ordered field, Complex number system, Topology of the real line, Neighbourhoods, Sequences and limits, Limit theorems, Monotonic Sequences, Limit Concept of a Real-Valued Function, Algebra of limits, Continuity, Monotonic functions, Differentiability, Rolle's Theorem, Mean-value Theorems, L'Hospital's Rule, Riemann Integral and the basic properties, Fundamental theorem of Calculus, Improper integrals

Recommended Texts:

1. *Elementary Real Analysis*- H.G.Eggleston
2. *Analysis*, S.R.Lay

ST 105/MT 107 Mathematics for Statistics (3 credits)

Vector methods: Introduction to vectors, Linear combinations, Linear dependence and independence, Bases and dimension, Scalar product, Vector product

Differential equations: First order ordinary differential equations, Exact equations, Higher order linear ordinary differential equations with constant coefficients

Linear Algebra: Preliminaries, Determinants, Simultaneous linear equations, Eigenvalues and eigenvectors, Matrix calculations, Special matrices, Range and null space, Decomposition of matrices, Quadratic forms. Differentiation of scalar functions of matrices.

Recommended Texts:

1. *Elementary Vector Analysis*, C.E. Weatherburn,(1982)
2. *A First Course in Differential Equations*, D.G. Zill, (1998)
3. *Linear Algebra*, K. Hoffman and R. Kunze, (1999)